

Date: Friday, 26/09/2008 10:59:35 AM
 User: Julie Lecocq

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : 212/205 HIGH FED X-TUBE ASSEMBLY
Job Number : 42308	
Estimate Number : 10254	
P.O. Number :	Part Number : D212664101
This Issue : 26/09/2008 S.O. No. :	Drawing Number : D212-664-141 REV C
Prsht Rev. : NC	Project Number : N/A
First Issue : / / Type : CROSSTUBES	Drawing Revision : C
Previous Run : 42307	Material :
Written By :	Due Date : 10/10/2008 Qty: 1 Um: Each
Checked & Approved By : <u>JD 08.9.26</u>	
Comment : Est Rev:E 04.02.16 Reformat KJ/DS Est Rev:F 06-03-29 Remove Comments on Pick List JLM Est Rev:G 07-04-30 As per Rev C JLM	

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0	DC	DOCUMENT CONTROL
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JD 08.10.01

**Comment:** DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-101 CHG003

S 8 08/10/23

2.0	PACKAGING 1	PACKAGING RESOURCE #1
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**Comment:** PACKAGING RESOURCE #1

3.0	D212664101TRN	Crosstube Turning Detail
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**Comment:** Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch 242305

DP 8-10-14

4.0	BENDING	BENDING MACHINE - SKIDTUBES
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**Comment:** BENDING MACHINE

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio FT015

DP 8-10-14

5.0	QC15	DIMENSIONAL CHECK OF X-TUBES
-----	------	------------------------------

**Comment:** DIMENSIONAL CHECK OF X-TUBES

08.10.14 11

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Job Number:



Seq. #: Machine Or Operation: Description :

6.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8548 & DT8549. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

4-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

RT 08-10-14

AVM 8-10-15

RT 08 10-14

7.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



AVM 8-10-15



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1 within 24 hours of bending and drilling

8.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

800/10/17 (U)

9.0

OUTSIDE SERV:11

OUTSIDE SERVICE -CROSSTUBES



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: 7407

LPI as per ASTM 1417 Level 2

Attach copy of NDT results to work order

C208101210

10.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage Ensure copy of NDT results attached to work order

8/10/20 (U)

11.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect for damage & ensure results are as per Dwg D212-664-141

10/10/20 (U)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Job Number: 42308

Part Number: D212664101

Job Number:



Seq. #: Machine Or Operation: Description :

12.0 SPRAY PAINTING SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

RT 08-10-21

13.0 QC14 INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Then, Wrap in plastic bag to protect from scratches

06-10-22

14.0 D28931 2.75 Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

Pick:

Qty Part number Description Batch

2 D2893-1 Support 40781

RT 08-10-22

15.0 D3595063450 RUBBER CUSHION



Comment: Qty.: 4.2000 Each(s)/Unit Total : 4.2000 Each(s)

Rubber Cushion (per sq ft)

.630" X 4.5" 4PCS

Batch: 40221

RT 08-10-22

16.0 MS2192025 Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-25 Clamp 108976

RT 08-10-22

17.0 CROSSTUBES CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2-Install supports with magnobond as per QSI 015 Adhere for for 12 Hrs

A/R 6398 Magnobond Batch: 108966

RT 08-10-22

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 42308

Part Number: D212664101

Job Number:



Seq. #:

Machine Or Operation:

Description :

Expiry Date: 09-10-06

3-Install clamps as per Dwg D212-664-141. Torque clamps to 80-100 in lb.

ET 08-10-23

18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

SS 08/10/23 (X)

19.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Pick Packing Kit

20.0

D34281

Placard



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

PLACARD

Batch: 41552

SS 08/10/23 (X)

21.0

AN635A

BOLT



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Bolt

Batch: M109282

SS 08/10/23 (X)

22.0

AN636A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Bolt

Batch: M108765 x2 M109232 x2

SS 08/10/23 (X)

23.0

AN960JD616

Washer



Comment: Qty.: 18.0000 Each(s)/Unit Total: 18.0000 Each(s)

Washer

Batch: M16937

SS 08/10/23 (X)

24.0

MS21042L6

Nut



Comment: Qty.: 6.0000 Each(s)/Unit Total: 6.0000 Each(s)

Nut

Batch: M168183

SS 08/10/23 (X)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Drawing Name: 212/205 HIGH FED X-TUBE ASSEMBLY

Job Number: 42308

Part Number: D212664101

Job Number:



Seq. #:

Machine Or Operation:

Description :

25.0

QC4

INSPECT 100% KITS FOR COMPLETENESS



Comment: INSPECT 100% KITS FOR COMPLETENESS

8/08/10/23 (XC)

26.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Identify and pack for shipping as per PPP D212-664-101

D 8/10/23

(C) Sef

27.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

08/10/24 J

Job Completion



MF 08-10-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

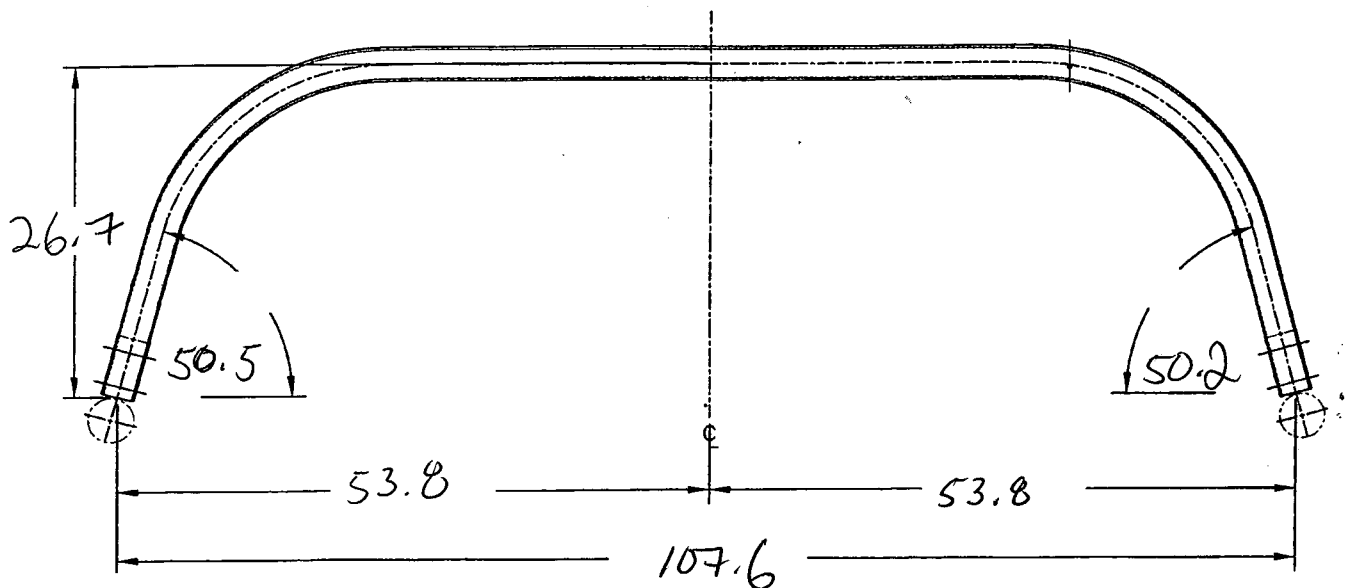
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order: 42309	
Description: Crosstube High Fwd (205/212/412)		Part Number: D212-664-101	
Inspection Dwg: D212-664-141 Rev: C			Page 1 of 1

Required Dimension	Min	Max
Height	26.79	27.05
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.7



Comments

QC15 Inspection	
Date	08/10/14

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.31	Dimensions updated per Dwg Rev C	KJ/JM	

DART**RELEASED**

07.04.24

DESIGN PH	DRAWN BY PH	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED GP	APPROVED PH	DRAWING NO. D212-664-141	REV. C SHEET 1 OF 3
DATE 07.03.08		TITLE XTUBE ASS'Y (205/212/412 HI FWD) NTS	
A	00.12.12	NEW ISSUE	
B	05.02.04	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	
C	07.03.08	REMOVE -851 ABRASION STRIP; ADD MAGNOBOND 6398, CUSHION, REVERSE CLAMPS	

Qty	Part Number	Description
X	D212-664-141	CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)
1	D6005-128	CROSSTUBE
2	D2893-1	SUPPORT
4	D3595-063-450	RUBBER CUSHION
4	MS21920-25	CLAMP (OR MS21920-26)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6005-128
FINISHED LENGTH = 126.51±0.020
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 10) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 12) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY

RETURN TO

ENGINEERING

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SUBJECT TO AMENDMENT

WITHOUT NOTICE

WORK ORDER

NO. 42308

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LIQUID PENETRANT TEST REPORT

P- 09128

PAGE 1 OF 1

CLIENT Dart Aerospace DATE 2008-10-20 TIME AM ☐ PM ☐
ATTENTION Linda Lacelle ACUREN JOB NO. 188-08-1949
ADDRESS 1270 Aberdeen st. PO/VO No. 7407
Hawkesbury, ont. WORK LOCATION Hawkesbury
ACCEPTANCE STD. ASTM 1417/1031-038 REV./DATE 2005
PROJECT 212/205 HIGH FWD X-TUBE ASSEMBLY, 206L AFT X-TUBE, 04-58 FWD X-TUBE ASSEMBLY,
ITEM(S) EXAMINED Sub's 42307, 42308, 41990, 41989, 41398, 41399, 41400

JOB DESCRIPTION WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE
PROCEDURE NO. LT-0003 REV./DATE 2003 TECHNIQUE NO. LT-0003 REV./DATE 2003
PART NO. D212664101, D206667203, D058676101, D058676201 MATERIAL ALOPINE ALUM. THICKNESS
SCOPE WET FLOURESCENT LIQUID PENETRANT INSPECTION CARRIED OUT ON 100% EXTERNAL SURFACE

TEST DETAILS

METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 8171 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT H₂O MINIMUM DWELL TIME 30 MIN. LIGHTING EQUIP. ☒ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER SKDS2 MINIMUM DRY TIME >10 MIN. OTHER CAL FEB 12 09
DEVELOPER SKDS2 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N CAL DUE DATE
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE

SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☐ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < - 4°C/ 20°F ☐ - 4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

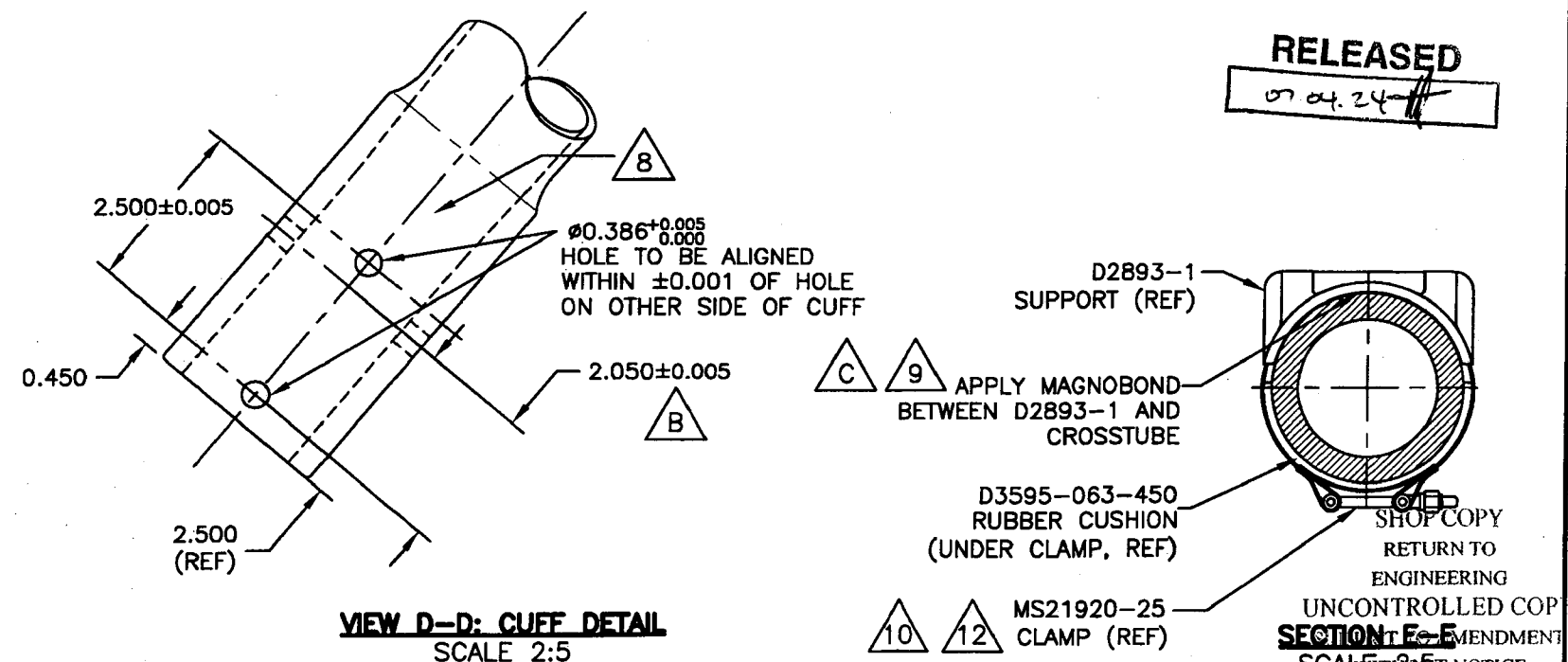
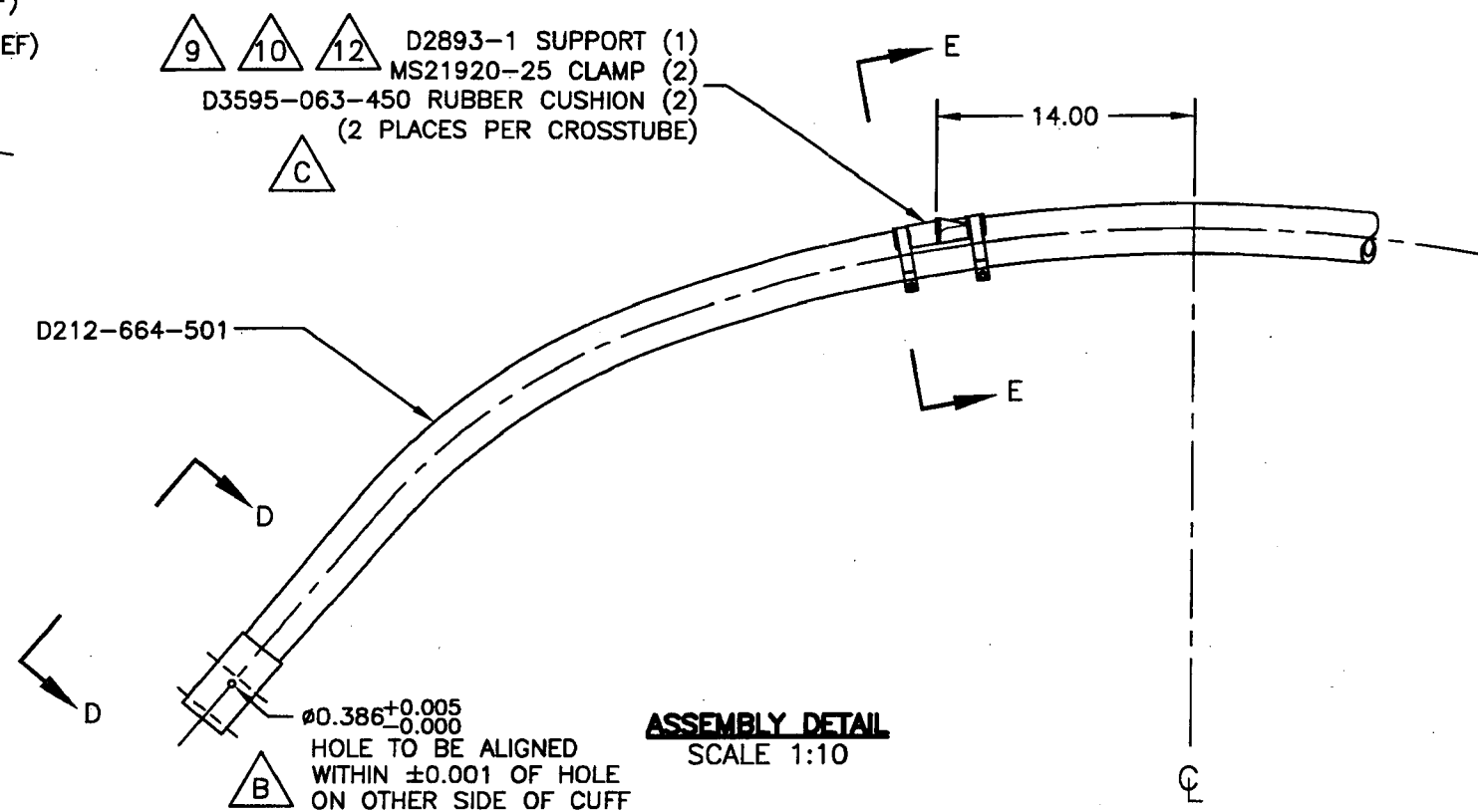
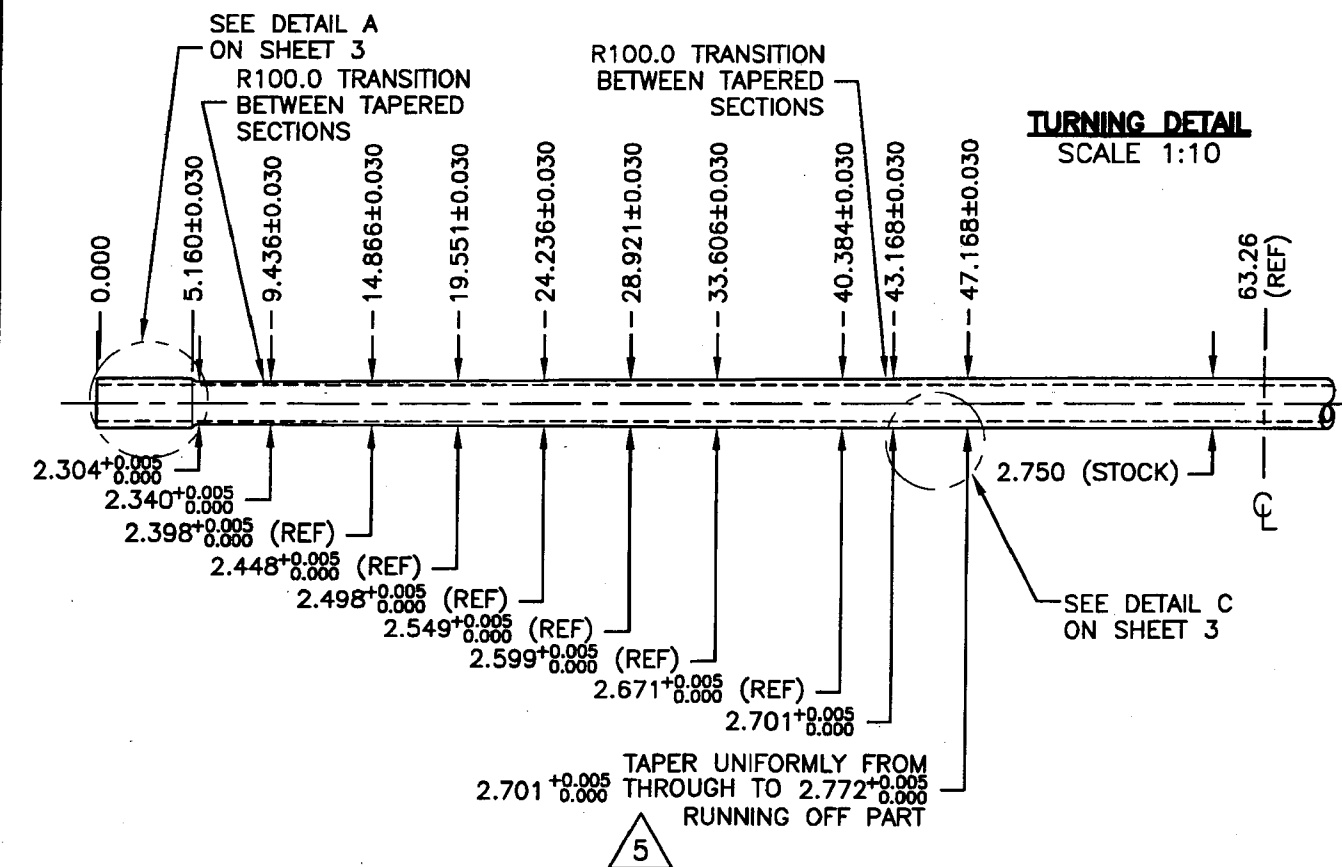
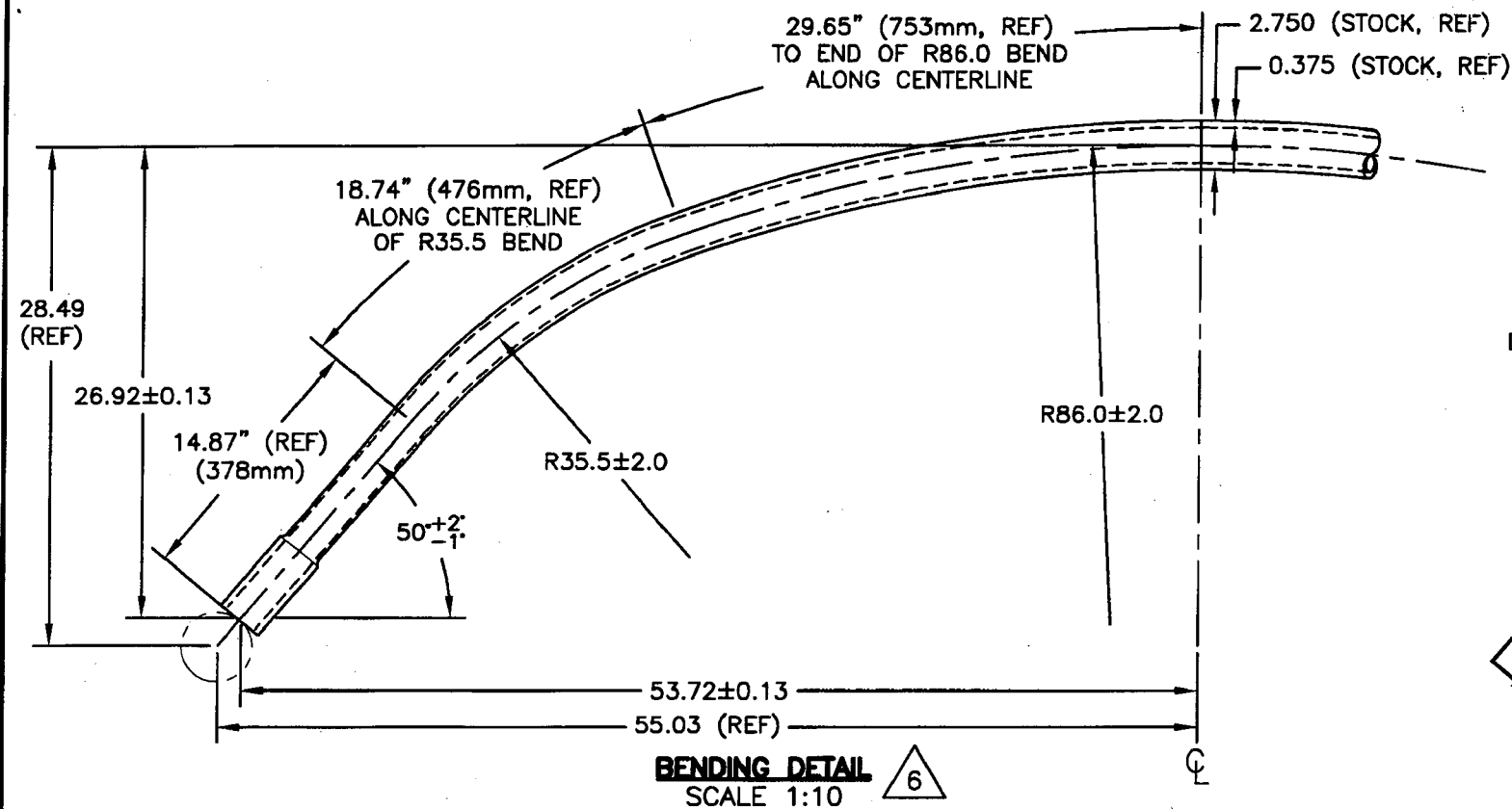
RESULTS- (☐ METRIC ☐ IMPERIAL)

ITEM #	COMMENTS	ACCEPT	REJECT
<u>42307</u>	<u>ACCEPTABLE</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>42308</u>	<u>ACCEPTABLE</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>41990</u>	<u>ACCEPTABLE</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>41989</u>	<u>ACCEPTABLE</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>41398</u>	<u>ACCEPTABLE</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>41399</u>	<u>ACCEPTABLE</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>41400</u>	<u>ACCEPTABLE</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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SIGNATURES

CLIENT REPRESENTATIVE [Signature] DTR #
TECHNICIAN (SIGNATURE): FREDERICK CHAGNON SIGNATURE REPORT REVIEWED BY:
NAME (PRINT): FREDERICK CHAGNON 1ST TECHNICIAN 2ND TECHNICIAN
CGSB LEVEL IV SNT LEVEL II CGSB LEVEL SNT LEVEL
CGSB REG. No 10560 CGSB REG. No



RELEASED

07.04.24

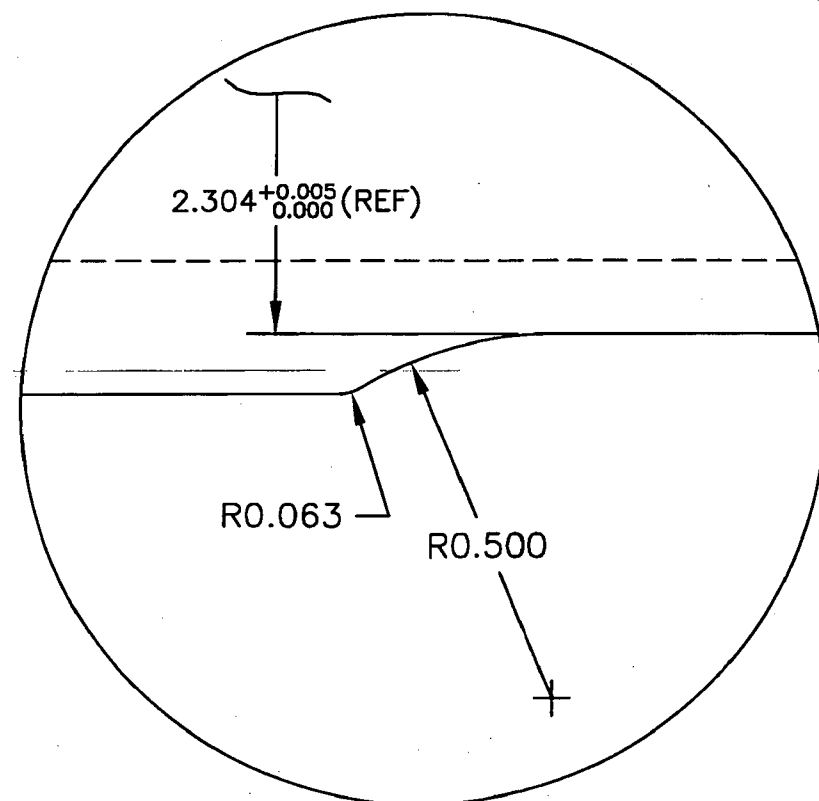
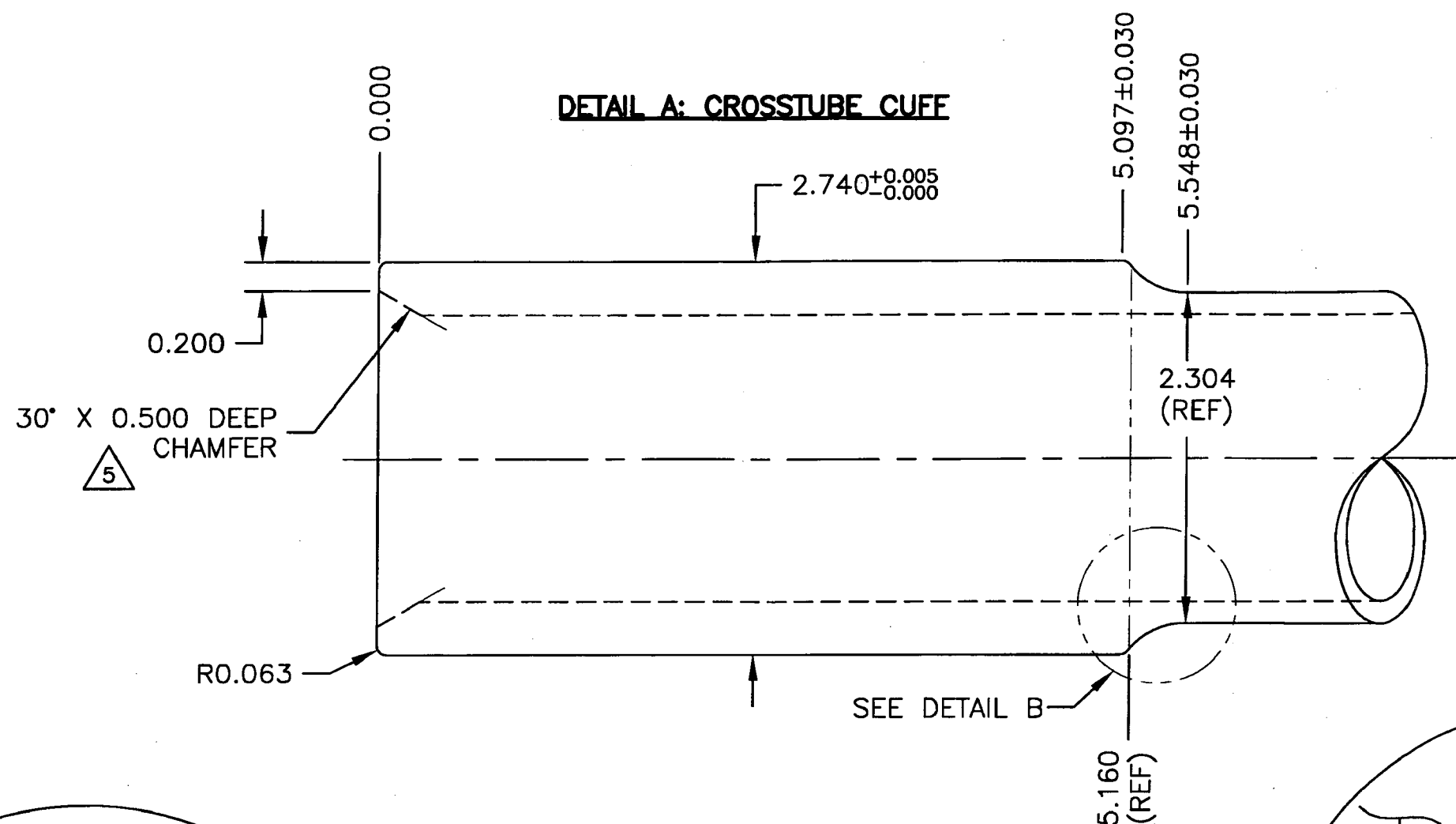
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DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. HAWKESSBURY, ONTARIO, CANADA
CHECKED GP	APPROVED [Signature]	DRAWING NO. D212-664-141	REV. C SHEET 2 OF 3
DATE 07.03.08		TITLE XTUBE ASS'Y (205/212/412 HI FWD) 1:10 SCALE	

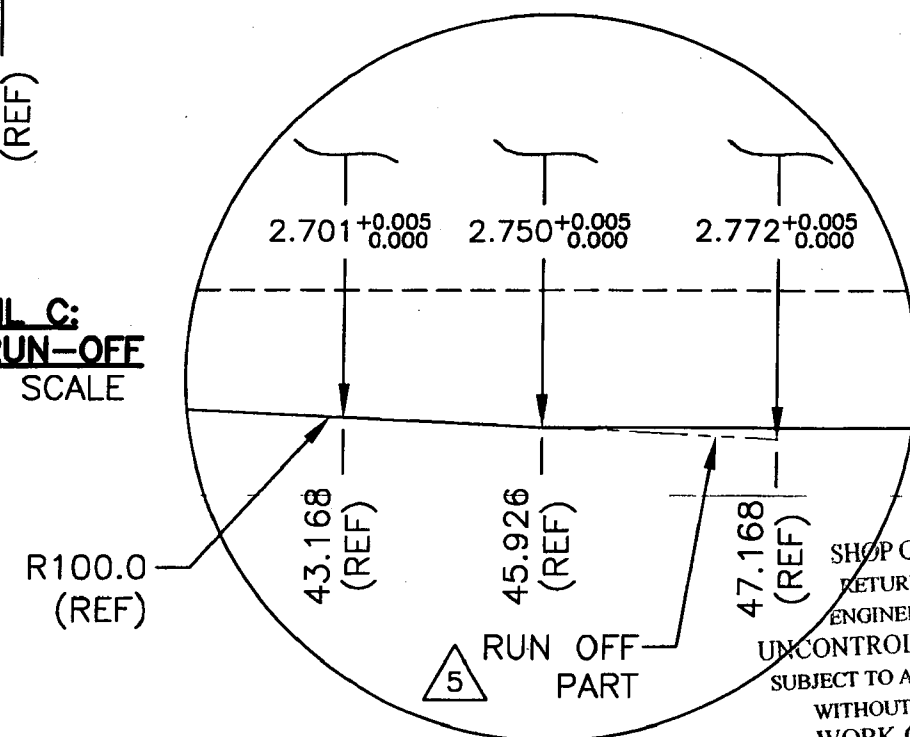
RELEASED
07.04.24 (P)
PER ELN 387

DETAIL A: CROSSTUBE CUFF



**DETAIL B: CUFF
TRANSITION**
SCALE 4:1

**DETAIL C:
TAPER RUN-OFF**
NOT TO SCALE



SHOP COPY
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DESIGN PH	DRAWN BY PH	DART	DART AEROSPACE LTD. HARRISBURG, ONTARIO, CANADA
CHECKED J	APPROVED [Signature]	DRAWING NO. D212-664-141	REV. C SHEET 3 OF 3
DATE 07.03.08	TITLE XTUBE ASS'Y (205/212/412 HI FWD)	SCALE 1:1	

